Space Weather Forecast

Issued on Sunday, 11 June 2023 at 13:20 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate X-ray flares (R1-R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low only common class flares observed, the largest from a sunspot region that is now barely visible as it approaches the western solar horizon. There are nine sunspot regions visible in total, however the majority of these are small, simple and stable. The main region of note is a broad collection of smaller spots in the southwest. Despite it lacking large main spots, this still has some magnetic complexity that brings the chance of isolated flares. No Earth-directed coronal mass ejections (CMEs) were observed in the last 24 hours, however a central southern disc 'filament' eruption was observed at 11/0855 UTC. This is where a line of plasma held together by the Suns magnetic field erupts, and can produced CMEs. However there is currently a lack of available imagery to assess if this has occurred.

Solar Wind / Geomagnetic Activity: The solar wind showed the connection to a fast wind environment, most likely from either of the coronal holes in the western disc. However there was also some increased interplanetary magnetic field strength that likely occurred due to this perhaps including a weak CME from 08 Jun. Solar wind speeds as observed by ACE were initially around 300km/s then gradually increased from 11/0100 UTC to be slightly elevated at near 400 km/s. The magnetic field strength increased from being Weak to become at Moderate by 11/0100 UTC. The north-south component became predominately positive (northward) but with occasional brief rotations to negative (southward). As the total field strength eased slightly, the north-south component trended to be more predominately negative. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be generally Low, but with a chance for isolated Moderate flares.

Solar Wind / Geomagnetic Activity: A CME associated with the Moderate flare on 09 Jun, is directed mainly behind Earth but has the potential to give a glancing influence, most likely on day 3 (13 Jun). No other CMEs are currently expected. Ongoing slightly elevated solar winds are expected days 1-3 (11-13 Jun) due ongoing coronal hole sourced fast winds, before easing day 4 (14 Jun). Quiet geomagnetic conditions expected with Unsettled spells. There is a slight chance of Active to G1 Minor Storm intervals, mainly late day 1 (11 Jun) due to ongoing fast winds, or late day 2 or day 3 (12 or 13 Jun) with any CME glance that may occur.

Energetic Particles / Solar Radiation: The count rate of energetic particles is forecast to remain at background with no solar radiation storms occurring. Although there is a very slight chance of increased particles counts, if any notable flares were to occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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